



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/605,085	06/26/2000	Jonathan H. Gross	IRI05342	3378

22863 7590 07/30/2003

MOTOROLA, INC.
CORPORATE LAW DEPARTMENT - #56-238
3102 NORTH 56TH STREET
PHOENIX, AZ 85018

EXAMINER

D AGOSTA, STEPHEN M

ART UNIT PAPER NUMBER

2683

DATE MAILED: 07/30/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

2m

Office Action Summary

Application No.

09/605,085

Applicant(s)

GROSS ET AL.

Examiner

Stephen M. D'Agosta

Art Unit

2683

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claim 1-20 have been considered but are moot in view of the new ground(s) of rejection:

1. Please note new examiner, Stephen D'Agosta, has been assigned this case.
2. While the examiner believes the first Office Action was sufficient in reading on all the applicant's claims, new prior art is provided for a "more exacting" rejection.
3. The applicant argued that Hogg does not teach portions of the independent claims (per the Office Action), specifically calculating a list of handoff candidates and a processor that performs this function. The examiner disagrees since he broadly interprets Hogg's disclosure of a handoff "from the current radio base station to a new base station with better signal attributes" (C3, L54-57) as reading on a general cellular handoff (as is known in the art) which requires the system to identify the location of the user, their direction of movement and possible candidate base station(s) to support a handoff (otherwise the system would not perform a handoff and the call would drop). The examiner interprets this as reading on the applicant's claim language and hence a list of viable cell sites would be generated by a processor, BTS, BSC or MSC that is supporting the call.

New art is provided:

- a. **Barnett** 5,509,051 teaches prioritization of neighboring cells for handoff
- b. **Mitchell** WO9945609 and **Ross** WO 9945609 teaches directing antenna array on plane (aircraft position data is determined as well) and **Ayyagari** WP08375678 for satellite/aircraft wireless communication using phased array (PAA).
- c. **Gilhousen** WO9602094 teaches airborne radio communication between phone user and ground base station and **Ray** teaches airborne BTS.
- d. **Upton** EP 0803742 teaches geo-location of satellite (eg. airborne-based) communication using range/Doppler and **Alanara** US 6,061,561 teaches cell transmitter location.

Art Unit: 2683

e. **ARCSS** demonstration briefing slides teach broad summary of air-to-ground communications to grounds station (eg. discloses BTS and GSM) and/or directly to user (via L-band).

4. The applicant argues that Martin's approach contrasts that of the applicant and points to their specification as to how/why – eg. packet data transmission. Hogg teaches a system that may (or may not) deal with packet data and hence, that portion of Martin is not considered relevant. What is considered relevant is the fact that Martin teaches what is not taught by Hogg (ie. the plane's location/direction, flight pattern). The examiner again notes that some of these "deficiencies" can be inherently found in Hogg (see #2 above) or in the newly cited art.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14 and 16-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Hogg et al. US 6,104,926 and further in view of (Ray et al. US 5,557,656 or ARCSS Slides or Gilhousen WO9602094 AND Martin et al. US 6,061,562, Ross US 6,275,187, Upton EP0803742, Alanara et al. US 6,061,561 and Barnett et al. US 5,509,051).

As per **claim 1**, Hogg [or RAY (abstract) or ARCSS (all slides) or Gilhousen (abstract)] teaches a method of maintaining a terrestrial cell site handoff list for airborne cellular system (C8, L61-67 to C9, L1-8 and figures 1–28 and C3, L54-57) comprising:

But is silent on

Maintaining a fixed beam pattern of beams transmitted from an airplane relative to cellular system users

Determining locations of respective cell sites within a vicinity of footprints of the respective beams transmitted from the airplane

Determining a location and heading of the plane

Determining location of respective beams transmitted from the airplane based on airplane flight pattern data

Determining locations of respective cell sites within a vicinity of footprints of the respective beams transmitted from the airplane

Calculating a list of viable handoff terrestrial cell site candidates based on maintaining of a fixed beam pattern, the determining of a location and heading of the airplane, the determination of locations of respective beams transmitted from the airplane based on airplane flight pattern and the determining of locations of respective cell sites

Martin teaches maintaining a fixed beam pattern of beams transmitted from an airplane relative to cellular system users (figure 1, #16, #40 and #42 and #46) and determining locations of respective cell sites within a vicinity of footprints of the respective beams transmitted from the airplane (figure 1 shows that airplane must be aware of cell sites #42 it is communicating with within its footprints).

Martin (abstract, figures 1, 2, 4 and 8a), **Ross** (figure 1 and abstract), **Upton** (abstract) and **Alanara** (figures 1-10 and abstract) all disclose obtaining location/heading/position of a "mobile user" (eg. person, car, aircraft).

Ross teaches directing respective beams transmitted from the airplane based on airplane flight pattern data (figure 1 and abstract).

Barnett teaches Calculating a list of viable handoff terrestrial cell site candidates based on maintaining of a fixed beam pattern, the determining of a location and heading of the user/airplane, the determination of locations of respective beams transmitted from the user/airplane based on user/airplane movement/flight pattern and the determining of locations of respective cell sites (the examiner notes that while Barnett is

Art Unit: 2683

focused on a mobile user and a BTS, it is broadly interpreted as reading on the claim simply by replacing the "mobile user" with an "aircraft" as taught by the art above).

With further respect to claim 13, Martin is silent on a database and processor. Barnett teaches a measurement list that is determined which requires a processor and storage.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that the system uses location of plane and beams and cell sites in footprint/vicinity to calculate handoff list, to provide means for the system to support plane-based handoffs as the plane roams.

As per **claim 2**, Hogg teaches claim 1 **but is silent on** teaches determination of location and heading comprises a flight pattern location of the airplane via telemetry link.

Martin teaches flight pattern via telemetry (C5, L30-42 and C8, L23-39 and C8, L57-62) and Ross teaches determination of aircraft position (abstract).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that flight pattern is used via telemetry, to provide means for ground contrl to determine plane location/flight pattern for communication support.

As per **claim 3**, Hogg teaches claim 1 **but is silent on** wherein calculating a list of viable cell sites comprises mapping data generated from maintaining fixed beam pattern, determination of location/heading of airplane, determination of beams transmitted form airplane flight pattern and determining location of cell sites to a database of viable handoff cell site candidates.

Barnet teaches a handoff candidate list/database (abstract).

Ross teaches directing an aircraft antenna array as it moves.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that viable candidate list comprises uses beam pattern, location of airpland, beams transmitted from plane and location of cells, to provide means for using this data to support optimal communications support between user and BTS.

Art Unit: 2683

As per **claim 4**, Hogg teaches claim 1 **but is silent on** ranking each handoff site based on probability data found during calculating list of candidate sites.

Barnet teaches prioritization list of neighboring cells (title and abstract).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that ranking is used, to provide means for prioritizing which cell site(s) are viable as handoff candidates.

As per **claims 5 and 20**, Hogg teaches claim 4 and using protocol dependence for cell site candidate list C7, L61-67 and C8, L1-52 – the user and cell being operable on two systems and/or possible of voice and data transmission).

As per **claim 6**, Hogg teaches claim 1 wherein the list of handoff sites is performed for each respective beams transmitted from airplane (figure 2, #40, C5, L29-54).

As per **claims 7 and 18**, Hogg teaches claim 6 **but is silent on** comprising dividing up list of handoff sites into multiple candidate groups according to geographic locations within each beam and cycling through multiple candidate groups to further reduce the list of handoff candidates based on multiple groups.

Barnet teaches prioritization of neighboring cells which can be grouped as required based upon user needs (ie. signal strength, location, heading, etc.).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that the handoff list is divided into groups based on location within each by and cycling through the groups to reduce list of candidates, to correlate cell locations and beam(s) supporting the cell(s) for optimal handoff support.

As per **claim 8**, Hogg teaches claim 7 **but is silent on** wherein cycling through groups introduces an associated handoff delay.

Barnet teaches calculating and prioritizing neighboring cells for a list of candidate handoff cell sites. This inherently requires time for calculation and hence would create an associated handoff delay.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that a handoff delay is introduced, since the calculation requires a finite amount of time to perform.

As per **claim 9**, Hogg teaches claim 1 comprising updating list of handoff sites as a function of time as the airplane pattern changes (figure 2 shows the plane #32 moving and its connections to various BTS's #36 as changing based).

As per **claim 10**, Hogg teaches claim 1 **but is silent on** wherein calculating a list of viable cell sites is performed to compensate for flight pattern changes caused by adverse weather conditions.

Martin teaches interference by weather, buildings, trees, vehicles and terrain (C4, L49-60 and C12, L30-64).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that a handoff list is based on flight patterns caused by adverse weather, to provide means for compensating for situations that will cause poor RF communications.

As per **claim 11**, Hogg teaches claim 1 comprising calculating viable airplane beams (C5, L5-10, C8, L27-37 and L61-67 and C9, L1-8) **but is silent on** beams for receiving handoffs from cell sites and creating an airplane beam handoff list based on the calculating of viable airplane beams.

Martin teaches (figure 1 #40 and 42) that as the plane moves, handoffs would occur based on the beam the RF link is being supported by.

Barnet teaches cell site handoff prioritization (abstract).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that beam handoff list is determined, to provide means for controlling beams for handing off RF links for optimal communications.

As per **claim 12**, Hogg teaches claim 1 **but is silent on** comprising dividing the list of handoff sites into time sensitive candidates and non-time sensitive handoff candidates.

Martin discloses supporting data such as voice, cable, video etc. (C2, L22-35) and these are time sensitive whereby an ISP (C2, L34) may be supporting data such as email is (less) time sensitive. One skilled in the art would provide for identifying time sensitive and non-time sensitive data for better quality of service.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that the handoff list is divided for time and non-time sensitive sites, to provide QoS to those links/users who require it.

As per **claim 14**, Hogg teaches claim 13 **but is silent on** the flight pattern information comprises airplane location, heading and beam footprint information.

Ross teaches directing an airplane's antenna array/footprint as does **Martin** (figure 1 shows footprint(s)).

Martin (abstract, figures 1, 2, 4 and 8a), Ross (figure 1 and abstract), Upton (abstract) and Alanara (figures 1-10 and abstract) all disclose obtaining location/heading/position of a "mobile user" (eg. person, car, aircraft).

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that flight pattern includes location, heading and beam footprint, to provide information between mobile and fixed ground station so they understand each other's position, heading and coverage to support all RF links optimally.

As per **claim 16**, Hogg teaches claim 13 wherein the receiver, database and processor are in the airplane and communicate with ground-based control station via telemetry link (figure 3, #46, C5, L30-42 and C6, L5-67 to C7, L1-7 and C8, L23-39).

As per **claim 17**, Hogg teaches claim 13 **but is silent on** wherein the handoff candidate list includes cell sites within a single communication beam.

Barnet teaches handoff list (abstract).

Martin teaches a system with multiple beam uplink/downlinks (figure 1, #40) for communication/handoff.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that handoff list includes sites within a single beam, to provide means for understanding how each user is connected/supported and if/when a handoff will be required (between beams, BTS's, etc.).

As per **claim 19**, Hogg teaches claim 13 **but is silent on** processor calculates handoff list for terrestrial sites to beams.

Barnet teaches a neighbor handoff list.

Martin teaches a system with multiple beam uplink/downlinks (figure 1, #40) for communication/handoff.

One skilled in the art would use the handoff list and correlate it to uplink/downlink beams for optimal operation.

It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that the processor calculates handoffs, to provide means for a computer to perform all operations for automatic handoff.

Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Hogg/Marting and further in view of Ayyagari et al. EP0837567

As per **claim 15**, Hogg teaches claim 13 **but is silent on** wherein the database and processor are implemented in ground-based BTS.

Barnet teaches ground-based communication for mobile users (abstract implies ground-based communications) and Ayyagari teaches a ground-based control system for airborne broadband communication network (abstract).

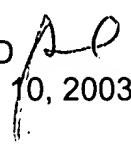
It would have been obvious to one skilled in the art at the time of the invention to modify Hogg, such that the database and processor are ground based, to reduce hardware required in the airplane/air (which reduces weight).


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. D'Agosta whose telephone number is 703-306-5426. The examiner can normally be reached on M-F, 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Trost can be reached on 703-308-5318. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

SMD 
July 10, 2003


WILLIAM TROST
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600